Electronic Version
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Claims

[c1] 1. A method for reading data from a high density optical recording medium; wherein the high density optical recording medium comprises:
a substrate;
a first dielectric layer formed on the substrate;
a recording layer formed on the first dielectric layer;
a second dielectric layer formed on the recording layer;
a reflective layer formed on the second dielectric layer;
the method comprising
generating a value using a formula Pr/(λ/NA), wherein Pr is a reading power, λ is a wavelength; and NA is a numerical aperture, wherein when the value is in a range of about 1.15 to about 8 mW/μm, a recording mark within the high density optical recording medium which is smaller than a resolution limit of an optical system is detected.

[c2] 2. The method for reading data from a high density optical recording medium of claim 1, wherein the recording layer is a phase-change material.

[c3] 3. The method for reading data from a high density optical recording medium of claim 2, wherein the phase-

change material comprises a metal.

[c4] 4. The method for reading data from a high density optical recording medium of claim 3, wherein the recording layer is a combination of an element selected from a group consisting of Ge, Sb, Te, Ag, In, Sn, Se, Ga, Bi and V group element, and oxide or nitride thereof.

[c5] 5. The method for reading data from a high density optical recording medium of claim 1, wherein the first dielectric layer and the second dielectric layer separately comprises SiNx, ZnS-SiO_2, AlNx, SiC, GeNx, TiNx, TaOx, YOx, GeCrN, AlNx, or a combination thereof.

[c6] 6. The method for reading data from a high density optical recording medium of claim 1, wherein a material of the reflective layer is selected from a group consisting of Au, Ag, Al, Ti, Pb, Cr, Mo, W, Ta, Cu, Pd and an alloy thereof.

[c7] 7. The method for reading data from a high density optical recording medium of claim 1, wherein the high density optical recording medium comprises an isolation layer between the second dielectric layer and the reflective layer.

[c8] 8. The method for reading data from a high density optical recording medium of claim 7, wherein the isolation

layer is selected from a group consisting of SiC, SiO_2, TiO_2, Al_2Ox, GeCrN, GeNx and AlNx.

[c9] 9. The method for reading data from a high density optical recording medium of claim 1, wherein the high density optical recording medium comprises an isolation layer between the first dielectric layer and the recording layer.

[c10] 10. The method for reading data from a high density optical recording medium of claim 9, wherein the isolation layer is selected from a group consisting of SiC, SiO_2, TiO_2, Al_2Ox, GeCrN, GeNx and AlNx.

[c11] 11. The method for reading data from a high density optical recording medium of claim 1, wherein the high density optical recording medium comprises a first crystallization-acceleration layer between the first dielectric layer and the recording layer.

[c12] 12. The method for reading data from a high density optical recording medium of claim 11, wherein the first crystallization-acceleration layer is selected from a group consisting of SiC, GeCrN, GeNx and AlNx.

[c13] 13. The method for reading data from a high density optical recording medium of claim 11, wherein the high density optical recording medium comprises a second

crystallization-acceleration layer between the recording layer and the reflective layer.

[c14] 14. The method for reading data from a high density optical recording medium of claim 13, wherein the second crystallization-acceleration layer is selected from a group consisting of SiC, GeCrN, GeNx and AlNx.

[c15] 15. The method for reading data from a high density optical recording medium of claim 1, wherein the high density optical recording medium comprises a polymer layer formed on the reflective layer.